

CLAIMS

1. A composition of matter comprising;
a vascularized densely collagenous tissue structure performing a biomechanical function in a body, the collagenous tissue structure having been treated *in vivo* in the body with a measurable amount of thermal energy which increased a cross-sectional diameter of a collagen fibrils in the collagenous tissue structure and decreased a longitudinal length of the collagen fibrils while preserving at least a portion of the biomechanical function performed by the collagenous tissue structure in the body.

2. The composition of claim 1, wherein the vascularized densely collagenous tissue structure was treated *in vivo* with sufficient and measurable thermal energy to create a scaffold for remodeling the collagen fibrils and/or the creation of new collagen fibrils.

3. The composition of claim 1, wherein application of the thermal energy changes the conformation of the collagen protein molecules from an extended organized conformation to a random coil, contracted conformation in order to achieve a macroscopic shrinkage along a longitudinal length of tissue.

4. The composition of claim 1, wherein the collagen fibrils were treated with sufficient thermal energy to increase a cross-sectional diameter of the collagen fibrils, decrease a longitudinal length of the collagen protein molecules and produce a substantially uniform histology.

5. The composition of claim 1 wherein the thermal energy was produced by an energy source selected from the group consisting of RF, microwave, resistive heating, ultrasonic and liquid thermal jet.

1 6. The composition of claim 1, wherein the geometry of the fibrils
2 was modified by delivering thermal energy *in vivo* to the vascularized densely
3 collagenous tissue structure at a temperature of 80 °C or less.

1 7. The composition of claim 1 wherein the geometry of the fibrils
2 was modified by delivering thermal energy *in vivo* to the vascularized densely
3 collagenous tissue structure at a temperature in the range of 45 to 75 °C.

1 8. The composition of claim 1 wherein the geometry of the fibrils
2 was modified by delivering thermal energy *in vivo* to the vascularized densely
3 collagenous tissue structure at a temperature in the range of 50 to 70 °C.

1 9. The composition of claim 1 wherein the geometry of the fibrils
2 was modified by delivering thermal energy *in vivo* to the vascularized densely
3 collagenous tissue structure at a temperature in the range of 55 to 65 °C.

1 10. The composition of claim 1 wherein the collagen containing
2 ligament or tissue structure is a collagen connecting tissue.

1 11. The composition of claim 1 wherein the collagen containing
2 ligament or tendon structure is a medial side ligament of the patella.

1 12. The composition of claim 1 wherein the collagen containing
2 ligament or tendon structure is a patellar tendon allograft.

1 13. The composition of claim 1 wherein the collagen containing
2 ligament or tendon structure is a patellar tendon autograft.

1 14. The composition of claim 1 wherein the collagen containing
2 ligament or tendon structure is a connecting tendon.

1 15. A composition of matter for changing a geometry of a portion of
2 a body comprising:

3 a vascularized densely collagenous tissue structure positioned within a
4 portion of a body, the collagenous tissue structure having collagen fibrils which
5 were treated *in vivo* in the body with a measurable amount of thermal energy to
6 modify a geometry of the collagenous tissue structure and the portion of the
7 body within which the collagenous tissue structure is positioned.

1 16. The composition of claim 1, wherein the vascularized densely
2 collagenous tissue structure was treated *in vivo* with sufficient thermal energy to
3 create a scaffold for remodeling the collagen fibrils and/or the creation of new
4 collagen fibrils.

1 17. The composition of claim 15, wherein sufficient thermal energy
2 was delivered to increase a cross-sectional diameter of the fibrils and reduce a
3 longitudinal length of the fibrils.

1 18. The composition of claim 15, wherein the thermal energy changed
2 a conformation of the collagen protein molecules from an extended structure to a
3 random coil, contracted conformation.

1 19. The composition of claim 15, wherein the collagen fibrils were
2 treated with a sufficient and measurable thermal energy to increase a cross-
3 sectional diameter of the collagen fibrils, decrease a longitudinal length of the
4 collagen fibrils and produce a substantially uniform histology.

1 20. The composition of claim 15, wherein the thermal energy was
2 produced from an energy source selected from the group consisting of RF,
3 microwave, resistive heating, ultrasonic and liquid thermal jet.

1 21. The composition of claim 15, wherein the geometry of the fibrils
2 was modified by delivering thermal energy *in vivo* to the ligament or tendon
3 structure at a temperature of 80 °C or less.

1 22. The composition of claim 15, wherein the geometry of the fibrils
2 was modified by delivering thermal energy *in vivo* to the ligament or tendon
3 structure at a temperature in the range of 45 to 75 °C.

1 23. The composition of claim 15, wherein the geometry of the fibrils
2 was modified by delivering thermal energy *in vivo* to the ligament or tendon
3 structure at a temperature in the range of 50 to 70 °C.

1 24. The composition of claim 15, wherein the geometry of the fibrils
2 was modified by delivering thermal energy *in vivo* to the ligament or tendon
3 structure at a temperature in the range of 55 to 65 °C.

1 25. The composition of claim 15, wherein the collagen containing
2 ligament or tendon structure is a collagen connecting tissue.

1 26. The composition of claim 15, wherein the collagen containing
2 ligament or tendon structure is a medial side ligament of the patella.

1 27. The composition of claim 15, wherein the collagen containing
2 ligament or tendon structure is a patellar tendon allograft.

1 28. The composition of claim 15, wherein the collagen containing
2 ligament or tendon structure is a patellar tendon autograft.

1 29. The composition of claim 15, wherein the collagen containing
2 ligament or tendon structure is a connecting tendon.

1 30. A composition of matter comprising:
2 a vascularized densely collagenous tissue structure positioned within a
3 region of a body which naturally attaches a first portion of the body to a second
4 portion of the body, the collagenous tissue structure having collagen fibrils which
5 were treated *in vivo* in the body with a measurable amount of thermal energy to
6 modify a position of the first portion of the body relative to the second portion of
7 the body.

1 31. The composition of claim 30, wherein the collagen fibrils were
2 treated *in vivo* with sufficient thermal energy to create a scaffold for remodeling
3 the collagen fibrils and/or the creation of new collagen fibrils.

1 32. The composition of claim 30, wherein the thermal energy
2 increased a cross-sectional diameter of the fibrils and reduced a longitudinal
3 length of the fibrils.

1 33. The composition of claim 30, wherein the thermal energy changed
2 a conformation of the collagen fibrils from an extended structure with a linear
3 configuration to a random coil, contracted state.

1 34. The composition of claim 30, wherein the thermal energy
2 increased a cross-sectional diameter of the collagen fibrils, decreased a
3 longitudinal length of the collagen fibrils and produced a substantially uniform
4 histology.

1 35. The composition of claim 30, wherein the thermal energy was
2 from an energy source is selected from the group consisting of RF, microwave,
3 resistive heating, ultrasonic and a liquid thermal jet.

1 36. The composition of claim 30, wherein the geometry of the
2 collagen fibrils was modified *in vivo*.

1 37 The composition of claim 30, wherein the geometry of the fibrils
2 was modified by delivering thermal energy *in vivo* to the vascularized densely
3 collagenous tissue structure at a temperature of 80 °C or less.

1 38. The composition of claim 30, wherein the geometry of the
2 collagen fibrils was modified by heating the collagen fibrils *in vivo* at a
3 temperature range of 45 to 75 °C.

1 39. The composition of claim 30, wherein the geometry of the
2 collagen fibrils was modified *in vivo* at a temperature range of 50 to 70 °C.

1 40. The composition of claim 30, wherein the geometry of the
2 collagen fibrils was modified *in vivo* at a temperature of 55 to 65 °C.

1 41. The composition of claim 30, wherein the collagen containing
2 tissue is a collagen connecting tissue.

1 42. The composition of claim 30, wherein the collagen containing
2 tissue is a medial side ligament of the patella.

1 43. The composition of claim 30, wherein the collagen containing
2 tissue is a patellar tendon allograft.

1 44. The composition of claim 30, wherein the collagen containing
2 tissue is a patellar tendon autograft

1 45. The composition of claim 30, wherein the collagen containing
2 tissue is a connecting tendon.

1 46. The composition of claim 30, wherein the region of the body is a
2 joint surface.

1 47. The composition of claim 30, wherein the region of the body is a
2 shoulder.

1 48. The composition of claim 30, wherein the region of the body is
2 selected from the group consisting of a shoulder, a spinal disc, an elbow, an
3 ankle, a wrist and a knee.

1 49. The composition of claim 30, wherein the first portion of the
2 body was brought closer to the second portion of the body.

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